A Work Project, presented as part of the requirements for the Award of an International Master Degree in Finance from the NOVA – School of Business and Economics.

Equity research: how sustainable is Nintendo's recovery?

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A Project carried out on the Master in Finance Program, under the supervision of:

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3.01.2020

Abstract:

After years of underperformance following poor sales of Wii U, Nintendo seems to have won the investors' praise all over again with its blockbuster Switch console. In this paper, we attempt to forecast how its sales and other value drivers affect the free cash flow available and whether the high current share price is justified. The outcomes of our study might be useful, among others, for industry analysts and academic researchers, as well as to Nintendo and other companies in the video game market.

Keywords: video games, Nintendo, Switch, handheld

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NINTENDO

COMPANY REPORT

ELECTRONIC GAMING & MULTIMEDIA

3 JANUARY 2020

RENAN DE LIBERAL, VADIM NIKITIN

Nintendo: beyond the Switch hype

Switch sales are impressive, but not enough

- Given the current price of ¥43,970, we recommend **selling Nintendo** with a target price of ¥41,447.26, as the buy investment represents a negative return of -4.57%, including an expected dividend of ¥512.2.
- Nintendo operates on a growing 13.4% YoY console market worth $47.9 billion but is at risk of missing out future value creation opportunities related to streaming, as the company is far behind the competition on that front.
- Launched in 2017, Switch is the second fastest selling console in Nintendo's history. Marketed as both a home console and a handheld, Switch has the potential to become one of the best-selling consoles ever. Revenues more than doubled from ¥489 billion to ¥1,056 trillion in the year Switch was launched.
- However, even with an assumption of 135 million lifecycle unit sales for Switch, which would make it the third best-selling console, Nintendo appears overvalued, both intrinsically and relatively to its peers.
- There is also an ongoing litigation against Nintendo related to poor manufacturing of controllers for Switch. Should the company lose it, it might have to spend approximately ¥36 billion replacing failed equipment and suffer an adverse effect on its reputation.

Company description

Nintendo is a Japanese manufacturer of home entertainment products. The Tokyo-listed company is best known for its handheld and home video game systems, such as Game Boy, Wii and, most recently, Switch. Nintendo is also actively engaged in producing content for its platforms, including IP like Mario, Legend of Zelda and Pokémon.

Recommendation:	**SELL**
Vs Previous Recommendation	
Price Target FY17:	**41,447.26 ¥**
Vs Previous Price Target	
Price (as of 6-Jan-20)	**43,970.00 ¥**

Reuters: 7974.T, Bloomberg: 7974:JP

52-week range (¥)	28,030-46,370
Market Cap (¥m)	5,789,485.93
Outstanding Shares (m)	131.669

Nintendo (blue) vs Nikkei 225 (orange)

Source: Reuters

(Values in ¥ millions)	2019	2020F	2021F
Revenues	1201	1326	1420
Gross Profit	501	539	577
EBITDA	256	262	282
Net Income	200	186	200
EPS	1,616	1,616	1,882
P/E	27.54	19.54	22.05

Source: Annual Report; Own Forecast

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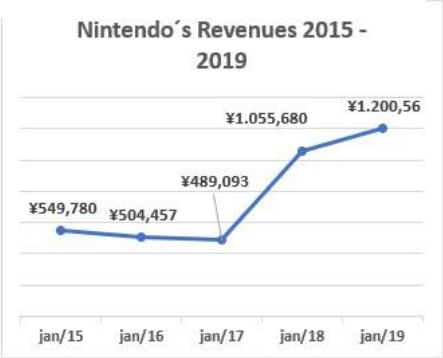
Table 1: Selected Nintendo Consoles

Name	Released
NES	1985
Game Boy	1989
SNES	1991
Virtual Boy	1995
N64	1996
GameBoy Color	1998
Game Cube	2001
Game Boy Advance	2001
DS	2004
Wii	2006
3DS	2011
Wii U	2012
Switch	2017

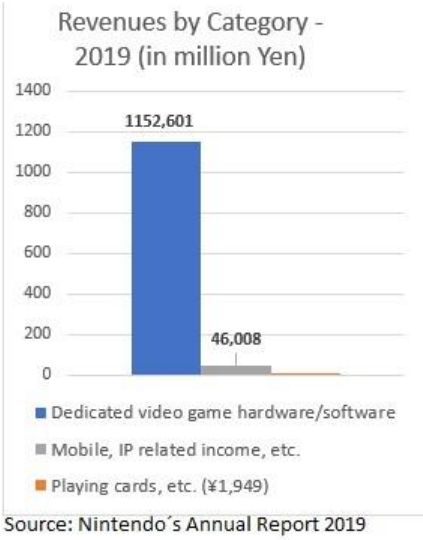
Source:Gamespot

Chart 1: Nintendo´s Revenues 2015-2019



Source: Nintendo´s Annual Report 2019

Chart 2: Revenues by Category



Source: Nintendo´s Annual Report 2019

Company description

Nintendo was originally founded in 1899 in Kyoto, Japan, initially producing playing cards traditional for Japan. It was not until the 1970s when Nintendo entered an arising market of video game hardware and software, which defines the company today. Nintendo's first widely successful video game console was Nintendo Entertainment System (NES), launched in 1983 in Japan and in 1985 in North America. Throughout its lifetime, NES sold 61.91 million units around the world and helped Super Mario Bros., the game it was bundled with, become one of the best-selling video games in history. 1988 marked the launch of Game Boy, a handheld system, which established Nintendo's foothold across both form factors.

From that point on, Nintendo produced 11 standalone consoles (Table 1). Throughout this journey, Nintendo has been constantly innovating with the concepts of its hardware products, with some examples including Nintendo DS, a foldable handheld with an additional touchscreen (later hardware update, 3DS added 3D effects) and Wii, a home console which featured unique motion controls and promoted more active gaming. Switch, Nintendo's latest product, is a hybrid platform that allows a seamless transition between the two gaming modes. When it comes to software, Nintendo sticks to its well-known IP without making too many changes from generation to generation, while also allowing third-party developers to distribute their content across Nintendo's platforms.

Over the 40 years in the video game business, Nintendo has sold more than 710 million hardware units and more than 4.5 billion video games. Nintendo of today is largely the same company it was 30 years ago: out of ¥1.2 trillion revenues reported in 2019, 96% is attributed to its dedicated video game hardware and software division, with mobile, licensing, and playing cards taking up the rest (Chart 1 and Chart 2). After going through some bad years following the poor performance of its then flagship console Wii U in the first half of the 2010s, Nintendo's most recent console, Switch, is a huge commercial success. The gross margin is 41.7%, while the net profit margin is 16.21%, up from 3.27% just three years ago.

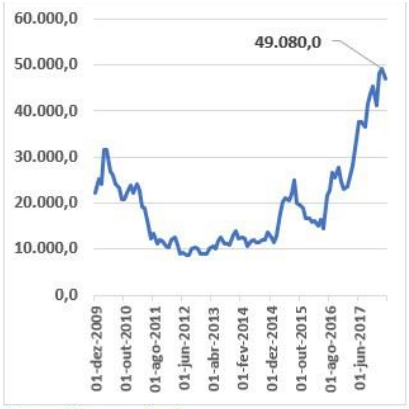
At ¥5.79 trillion ($53 billion), Nintendo is the single largest pure video game company in the world. Two of its biggest competitors are much larger, but gaming is less core to their business models. Sony, at ¥9.42 trillion market cap, derives only about 27% of its revenue from its Game & Network Services division, while for Microsoft ($1.2 trillion market cap) gaming contributes less than 10% of revenue. This discrepancy in size puts Nintendo in a tough spot, as both Sony and Microsoft seem more resilient to any downturn in their gaming businesses,

Chart 3: Nintendo´s Stock Price (JPY)

Chart 4: Nintendo´s Distribution of Ownership

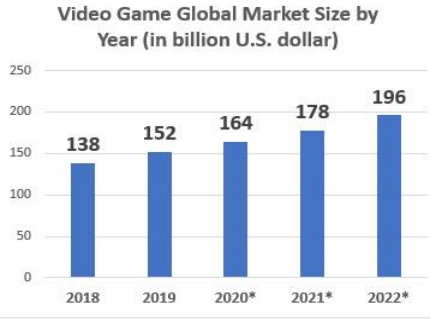
Source: Nintendo´s Annual Report 2019

Chart 5: Nintendo´s Stock Price (Dec/09 – March/18)



Source: Thomson Reuters

Chart 6: Video Game Global Market Size



Source: Newzoo

having the cushion of other divisions. Yet Nintendo's grip on its market is strong: for the last year, the share price is up more than 50% and is 292% higher than the 5-year low in February 2015 (Chart 3).

Shareholder structure

Nintendo is listed on the Tokyo Stock Exchange and currently has 131,669,000 shares outstanding. Nintendo's biggest shareholder is JP Morgan Chase with a stake 10.74%, followed by The Master Trust Bank of Japan (4.99%), Japan Trustee Services Bank (4.65%), The Bank of Kyoto (4.10%) and the Nomura Trust and Banking Co. (3.53%). In terms of distribution of ownership, foreign institutions and individuals collectively own 49.20% of the company and Japanese financial institutions own 26.43%, while 9.53% are constituted by treasury shares, 8.48% is owned by Japanese individuals and others, and the remaining 6.36% is owned by Japanese securities firms and other Japanese corporations (Chart 4).

As evident, a large part of Nintendo is owned by Japanese banks, which is part of a larger practice of cross-shareholding common in corporate Japan. Listed companies in the country hold chunks of one another, which constitute up to 20% of the local equities' valuations. As much as it is widespread, cross-shareholding has been called into question for two main reasons: it creates an entanglement of companies that will make the whole market more vulnerable during turbulent times, and it gives corporate executives too much comfort, as cross-shareholders tend to vote in favor of management decisions. In 2018, the Japanese financial regulator revised the corporate governance code to restrict cross-shareholding, but the progress country-wise has been slow. In this light, Nintendo is making significant progress on corporate governance: in February 2019, Bank of Kyoto announced that it would reduce its stake in Nintendo, the bank's biggest holding. To compensate for the selling pressure, Nintendo announced a simultaneous share buyback and cancellation of some treasury shares. Finally, to diversify its investor base towards retail, the company placed more shares with retail investors.

On that front, however, much remains to be done. In early 2018, evident success of Switch pushed Nintendo's share price above ¥48,000, close to a 10-year high, and effectively out of reach for many retail investors, considering that Tokyo Stock Exchange imposes a minimum order of 100 shares. Consequently, Nintendo faced investor pressure to split its stock to broaden the shareholder base, which, the argument went, would display a commitment to greater transparency. Up to this date, Nintendo did not make any plans regarding the

Chart 7: Fortnite User Base

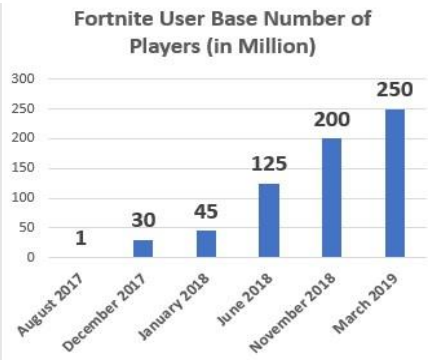
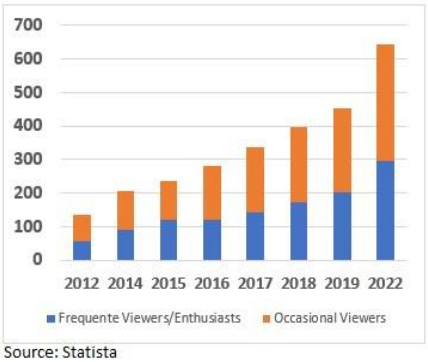
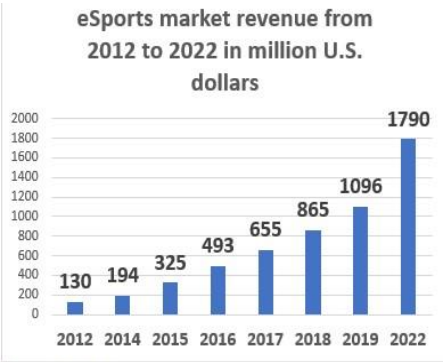


Chart 8: eSports Worldwide Audience Size (2012-2022)



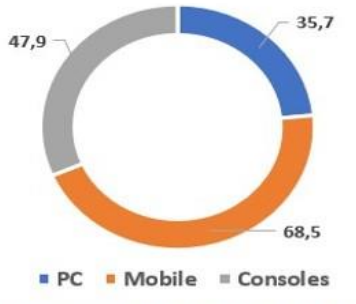
Source: Statista

Chart 9: eSports Market Revenue (2012-2022)



Source: Statista

Chart 10: Segmentation of Video Game Market (in Billion U.S. dollar)



Source: Newzoo Global Market Report 2019

stock split, but in early 2019 the company's spokesperson said the measure was considered an option.

The Sector

Overview of the video game market

Often overlooked as a younger form of entertainment, the video game market has quietly grown to what is estimated at $152 billion globally (Wijman, 2019), potentially reaching $196 billion in 2022 (Chart 6). That is more than the $96.8 billion movie industry and far above the music with its $19.1 billion (Vanian, 2019). To name some examples underscoring such success, Grand Theft Auto V, released in 2013, became the highest-grossing media title of all time, making $6 billion in sales with a budget of $265 million. Fortnite, a free-to-play online game, grew its user base exponentially (Chart 7) and reached 250 million players worldwide in March 2019 (Gough, 2019). In the US, e-sports are estimated to have more viewers than any other sport other than NFL by 2021 (Syracuse University, 2019) and it is expected to reach worldwide market revenue of $1.7 billion (Chart 8 and Chart 9).

On the macro level, there are three main categories defining video games (Chart 10). First, there is the Console market, valued at $47.9 billion annually and growing 13.4% YoY. This category includes dedicated hardware, sold as a home or handheld console, and the software meant to be played (often exclusively) on that hardware. There are three key winners in consoles: Nintendo, Sony, and Microsoft, which have been dominating the space for years and have customers effectively locked it to their platforms, creating strong brand loyalty that is often carried across generations of consoles. Said generations are another defining feature: a console's life cycle is about 5 to 7 years, after which console majors introduce their new hardware line-ups and slowly stop extending the software library for the outgoing generation to facilitate the migration of customers (Table 2). Looking at the current generation, Sony appears to be the absolute winner with 103 million PlayStation 4 consoles sold, with Microsoft Xbox One (47 million units) and Nintendo Switch (35 million units) trailing behind. Seeing it this way, however, ignores two facts and distorts the real market shares. In 2015 Microsoft stopped reporting unit sales of its Xbox consoles, which means that there is no reliable way to gauge this metric anymore, but the move itself likely symbolizes weak sales. Then, Nintendo Switch was launched in March 2017, more than three years after the two other consoles. This explains the big gap in unit sales and shows that Nintendo does not necessarily come last in the race. On the contrary, when looking at consumer interest measured through e-commerce

searches, Nintendo comes first (Bobrov, 2018) with a big lead over its competitors (Chart 11).

Most consumers only buy one console in a generation – given that a home console costs north of $300 at launch and many popular games are available on more than one console (content producers, such as Activision Blizzard, Ubisoft or Take-Two Interactive, are often independent from the console majors and benefit from getting the widest possible distribution for their products). This creates immense pressure for Nintendo, Sony and Microsoft to entice consumers to their platforms. The main weapon in this race is software exclusives, produced by first-party game development subsidiaries of each major. Such exclusive games require heavy investments but eventually differentiate the three platforms, similar in hardware, between one another (Chart 12).

The second category is PC, worth $35.7 billion and growing 4.0% YoY (Chart 13). Unlike the console market, PC is much more decentralized: although Microsoft boasts a heavy market presence with its Windows operating system, its open-end nature means that the company does not control the distribution of content the same it does in its Xbox ecosystem. This enabled the recent proliferation of smaller, indie games, created with limited resources of independent studies, and contributed greatly to many innovations in video games, with the vastly popular MOBA and battle royale genres tracing their roots back to the PC gaming. The abundance of these games far exceeds the ability of consumers to analyze all of them when deciding on a purchase. This means that the platform is practically controlled by the parties who control product discovery. In the case of PC, it is Valve and its Steam and, more recently, Epic Games, which used the money from the cash cow that is Fortnite to finance numerous exclusive deals for Epic Game Store (EGS), its upstart competitor to Steam. In 2019 Steam reached (Lanier, 2019) one billion registered accounts and 90 million monthly active users, up 23 million from the year before (Chart 14). Such concentration creates somewhat of self-censorship for the content producers: even though there are no barriers to release a game on PC, independent studios are heavily incentivized to be present on Steam or EGS and, therefore, comply with their publishing rules and pay up to 30% fee on sales. PC also remains the major platform for e-sports, which is increasingly competing with traditional sports both in terms of viewership and prize pools (Chart 15).

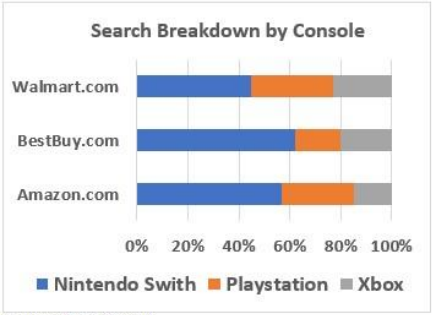
Last, but clearly not least, comes the mobile market with its hefty $68.5 billion, growing 10.2% YoY. Within this category, value is split between smartphone games with $54.9 billion (5.0% YoY growth) and $13.6 billion (11.6% YoY growth) in tablet games (Chart 16). Mobile games have enjoyed great success over the past decade, as smartphones were equipped with an increasingly bigger

Table 2: Console Generations

Consoles	Generation
Magnavox Odyssey	1st
Atari 2600	2nd
NES	3rd
SNES/Genesis	4th
PS1/N64/Saturn	5th
PS2/Dreamcast/Game	6th
PS3/Xbpx/Wii	7th
PS4/Xbox One/Wii U/Sw	8th

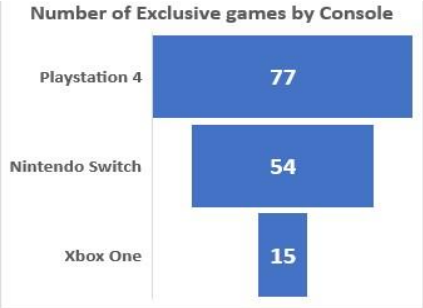
Source: Gamespot

Chart 11: Search Breakdown by Console (April/2017 – March/2018)



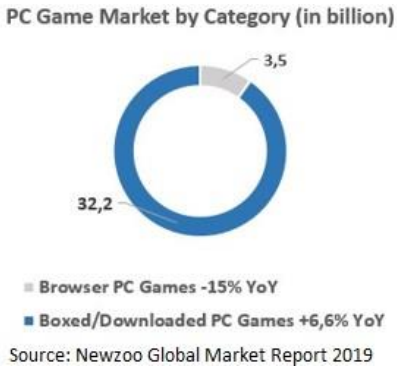
Source: SimilarWeb

Chart 12: Number of Exclusive Games by Console (until Dec/2019)



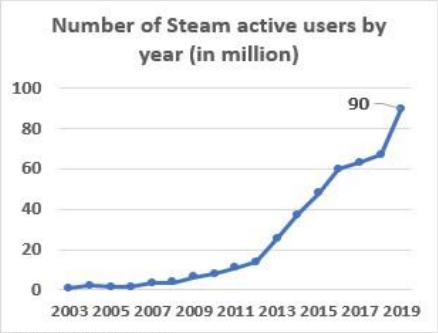
Source: GEMATSU

Chart 13: PC Game Market by Category (in Billion)



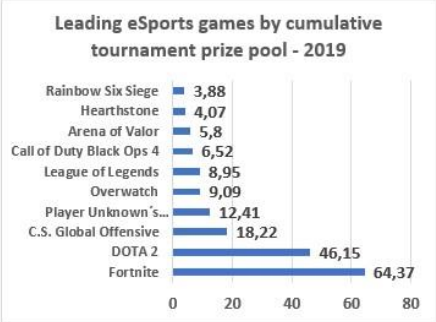
Source: Newzoo Global Market Report 2019

Chart 14: Number of Steam Active Users by year (in Million)



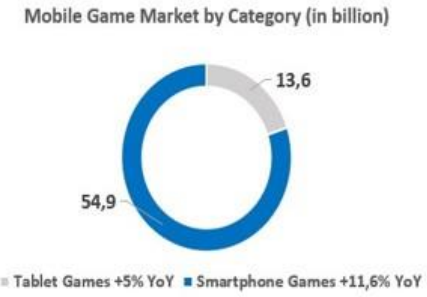
Source: Medium.com

Chart 15: Leading eSports Games in 2019, by cumulative tournament prize pool (in Million U.S. dollar)



Source: Newzoo Global Market Report 2019

Chart 16: Mobile Game Market by Category (in Billion)



Source: Newzoo Global Market Report 2019

Chart 17: Global Game Market per Region

screen and powered with hardware matching this of low-end PCs. Even more importantly, mobile reached a wide audience, particularly in emerging markets, that could not afford a dedicated console or an expensive gaming PC. The distribution model had to adapt as well – most mobile games are free-to-play (F2P), contrasted with a standard $60 per AAA game on consoles. Despite being nominally free, these games offer in-game purchases that allow faster progress or some kind of advantage over other players. The distribution of paying players is heavily skewed, with less than 3% of all players paying any money for such content, and the top decile of those contributing 46% of all revenues, effectively subsidizing the costs of game development and subsequent maintenance (Johnson, 2014). Yet the overall revenue from mobile games is hard to overestimate: market leaders such as Clash Royale rack up $2.3 million daily in player spending, while cash flows from gaming allow Tencent, a Chinese tech giant, to keep other, less profitable products, such as its super-app WeChat, afloat.

In terms of geographies, 47% of the video game market value comes from Asia-Pacific (50% of which is attributed to China), followed by North America (26%), EMEA (23%) and Latin America (4%) (Chart 17). Due to its reliance on Asia, the video game market is vulnerable to any major shift in this area. One of the latest examples was a regulatory crackdown in China, which imposed rules that prohibit gamers under 18 to play online between 22:00 and 08:00 and restrict gaming to 90 minutes on weekdays and three hours on weekends and holidays (BBC, 2019).

Growth drivers for the industry

One of the most transformative trends of the past decade was the emergence of games as a service (GaaS), similar to software as a service (SaaS) that changed the business software landscape. Traditionally, content producers would invest in producing games that were fully finished upon their market release, and only then they would repay their investment by selling individual copies of the game. The profit, if there is any, would be reinvested into producing the developers' next game. With GaaS, games get post-release support in the form of new content, which keeps players engaged and willing to pay more. The most popular ways of monetizing such service are microtransactions, which involve selling minor in-game content for a low price (e.g. rare clothing for a game character), and subscription/season passes, which restrict access to new content to paying users. Most successful service-based games, like Fortnite, utilize both methods. Free-to-play games have made $87.7 billion in Revenue in 2018 and the top 10 games have made more than $13 billion (Chart 18). While producing blockbuster

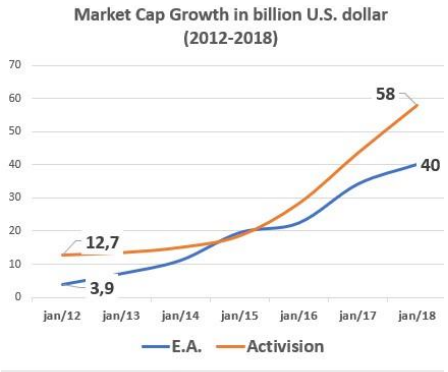
games is a highly unpredictable business, running a few popular GaaS brings in steady revenue streams, which increases the value of companies in this segment. Clear evidence of this is presented in a 2018 study (Batchelor, 2018) that attributes the $80 billion combined growth (since 2012) of Electronic Arts and Activision Blizzard, two game publishers, largely to their GaaS efforts (Chart 19). But gamers' reception to post-release monetization was mixed at best, with many being disappointed about having to pay extra after buying a $60 title. This can have a clear impact on GaaS going forward: following public outrage, Electronic Arts decided to remove in-game paid "loot boxes" from one of its biggest titles, Star Wars Battlefront 2, while the EU gambling regulators decided to investigate the practice (Kent, 2019).

Chart 18: Top 10 Free to Play Games Revenue in 2018 (in Billion U.S. dollar)

Source: SuperData

The next big trend is streaming, which already disrupted the adjacent movies and music markets. Mostly due to technical reasons, streaming found it much harder to penetrate the video game market. Whereas streaming movies only requires one-way download from the server, which can be cached to smooth out ups and downs in the internet connection, the interactive nature of video games requires continuous back-and-forth communication with the server, and the speed of this communication, if not sufficient, can ruin the experience or even render some games unplayable. This means that streaming video games requires a very fast, unlimited internet connection, which naturally limits the addressable user base. Despite all these limitations, there have been several attempts to break into video game streaming, and right now we are arguably witnessing another wave of such efforts. OnLive, a California-based video game streaming service, announced its platform as early as 2009, but delivered poor user experience and ended up selling most of its assets to Sony, where they were used in Sony's own streaming offering, PlayStation Now. Introduced in 2014, PlayStation Now had a slow start and, priced at $19.99/month, could not win a large audience despite Sony's impressive back catalog.

Chart 19: Market Cap Growth in Billion U.S. dollar (2012-2018)



Source: Thomson Reuters Eikon

The opportunity for streaming video games is theoretically so large that even Alphabet, having no material presence in gaming before, decided to join the race. In early 2019 the company unveiled Google Stadia – a video game streaming platform that leverages Google's technological might to offer high-quality (up to 4K) game streaming with little downtime. Yet there is little evidence that Alphabet will successfully capture a significant market share (Hollister, 2019) – Stadia launched in November 2019 without many announced features but with a questionable pricing model – unlike Netflix's subscription for unlimited access to its library, Stadia's subscription will only give access to its streaming infrastructure, with users then having to pay full price for any game they want to

enjoy on Stadia. Given Google's history of quickly abandoning underperforming products, the streaming future of video gaming might not be there just yet.

That, however, does not necessarily mean that Netflix - like subscription services are not fit to video games – if we overlook the lack of instant streaming, there is quite some evidence pointing to the contrary. 2019 saw the launch of numerous subscription-based services that give users access to wide libraries of ready-to-download games. With this model, the technological edge becomes secondary to the quality of the game library. Therefore, it is not surprising that two out of three main subscription services launched in 2019 are owned not by console majors, but by big content publishers – namely Electronic Arts (best known for FIFA and Need for Speed series) and Ubisoft (Assassin's Creed and Far Cry). The third was Microsoft's Xbox Game Pass, which brought many Xbox exclusives to Windows for the first time (Table 3). While it is too early to make conclusions about their performance, such services might be a viable option for consumers to move away from owning expensive games and for companies to de-risk their cash flows with recurring revenues.

Table 3: Main Video Game Subscription Services

Service	Monthly Price	Company
Apple Arcade	$4.99	Apple
Playstation Now	$9.99 - $59.99	Sony
Xbox Game Pass	$9.99 - $14.99	Microsoft
Google Stadia	$9.99	Alphabet
EA Acess	$4.99	Electronic Arts
Origin Access	$4.99 - $14.99	Electronic Arts
Uplay+	$14.99	Ubisoft

Source: IGN.com

Nintendo's positioning

Up until 1994, Nintendo was an undeniable leader, combining its proprietary hardware with games that had a cult-like following. Then Sony introduced PlayStation that featured much more realistic graphics and sound and sold over 102 million units. Nintendo's response, Nintendo 64, sold only 33 million units. Things got worse in the next, sixth, generation. Not only PlayStation 2 was hugely successful (eventually it became the best-selling console ever with over 155 million units sold), but Microsoft also entered the race. Meanwhile, GameCube, Nintendo's sixth-generation entry, sold only 22 million units and was widely considered a failure (Table 4).

Table 4: Best Selling Consoles

Consoles	Units Sold (m)
Playstation 2	155
Nintendo DS	154
Game Boy (+Color)	119
Playstation 4	103
Playstation	103
Nintendo Wii	102
Playstation 3	87
Xbox 360	84

Source: VGChartz

In 2002 Satoru Iwata, a relatively low-profile game developer, took over as CEO of Nintendo. He recognized that games were increasingly revolving around realistic graphics and c complex gameplay mechanics demanded by the core audience. Iwata saw an opportunity to make a product for the non-core audience, differentiating Nintendo from the intense technological competition. The company's first product under Iwata's leadership, Nintendo DS, was hardly a technological breakthrough, but its small screens and lack of high-resolution sound meant that producing games for DS was relatively cheap, which in turn allowed game developers to experiment with different genres and formats and push the creative boundaries of the industry. Contrary to its past handheld console, Game Boy, Nintendo promoted DS to girls as well, offering a version in

pink. Nintendo DS was a huge success, selling 154 million copies worldwide throughout its lifetime.

This approach of reaching a wider, non-target audience was at the core of Nintendo's strategy ever since. As Iwata himself put it:

"Many people in this industry tend to categorize our customers into two groups — one is the core gamer and the other is casual gamers…We want to create a kind of cycle where casual gamers are gradually growing up to become passionate players. In order to maintain that kind of cycle, we needed to break down the wall."

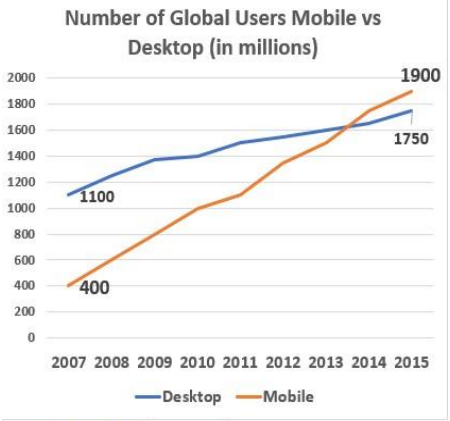
Nintendo's next console, Wii, went even farther towards the casual gamers, replacing the traditional gamepad with many buttons, often confusing for non-gamers, with a simple, motion-controlled remote. In terms of hardware capacity, Wii was purposely positioned miles behind its peers, PlayStation 3 and Xbox 360, instead offering a more reasonably-priced experience, both for developers and end-consumers (Table 5). The strategy worked, as Wii did not directly compete with consoles from Sony and Microsoft, capturing the wider non-core market all to itself. And even within the core gaming circles, the radically different gaming experience that Nintendo offered meant that owners of PlayStation and Xbox could open their wallets once again for Wii. The console sold 102 million copies in its lifetime, outselling both PlayStation 3 and Xbox 360 and becoming the fastest selling console of all time. Even more impressive, whereas Sony and Microsoft lost money on every console sold in order to gain market share, Nintendo was making unit profits.

Table 5: Consoles Prices in USA at the Release date

Console	Price in USA	Release Date
Nintendo Wii	US$ 249,99	Nov/2006
Xbox 360	US$399,90	Nov/2005
Playstation 3	US$599,00	May/2006

Source: Game Spot

Chart 20: Number of Global Users Mobile vs Desktop (in million)



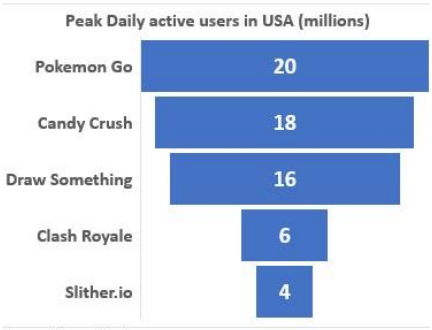
Source: Morgan Stanley Research

While Nintendo managed to intelligently avoid direct competition with other console majors, the upcoming revolution in mobile lured away the very casual gamers Nintendo was targeting. Ironically, high-end consoles of Sony and Microsoft were differentiated enough from mobile games to keep selling in the smartphone era, leaving Nintendo exposed. The pressure was so high that Nintendo's management had to cut their salaries by 20% to 50%. Seeing the rise of tablets and tablet gaming (Chart 20), the Japanese company decided to counter the threat with a tablet of their own – Wii U. The new console received poor reviews, citing low-quality display and touchscreen, and sold only 13.6 million units before Nintendo stopped supporting it in 2017.

The lackluster performance of Wii U put Nintendo in a dire financial situation, and analysts urged the company to abandon the hardware altogether and turn to mobile gaming. For a while, the company listened. Nintendo partnered with a mobile game developer Niantic to create Pokémon Go. Released in 2016, the geolocation-based game became a cultural phenomenon, having its players walk

around real cities collecting Pokémon and fighting against one another. With over 20 million daily users, Pokémon Go became the most popular mobile game, capturing a wide range of players across genders and generations (Chart 21).

Chart 21: Peak Daily Active Users in USA (in million)



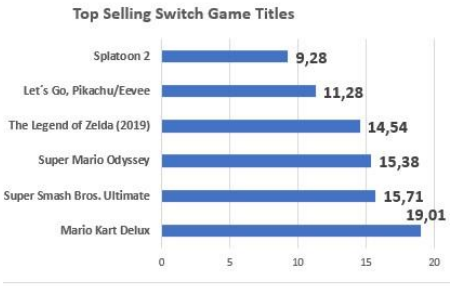
Source: Survey Monkey

Nintendo also ventured into developing its own mobile games, utilizing some of its most famous franchises like Mario, Fire Emblem and Animal Crossing. Most of them were distributed for free but had in-game payments to unlock additional content. While most games did relatively well, it was not a tremendous success around which Nintendo could reinvent itself. And so, it went back to the console business.

Iwata, a long-standing CEO of Nintendo, died at 55 in 2015. His last project was Nintendo Switch, a hybrid console that could be played at home as well as on the go. Launched in early 2017, Switch contained little to no functionality that was not related to gaming – while dashboards of PlayStation 4 and Xbox One had browsers, social features, and applications such as Netflix, Nintendo purposely stripped away all side features to focus on what it does best – games.

In terms of software, Nintendo aimed for games that were much more complex than on mobile but still more accessible than those characterizing the other major consoles. Detachable controllers (called Joy-Cons) allowed for easy multiplayer with friends, while the multimodality of Switch once again left Nintendo competing against itself. The financial impact did not take too long, with Switch soon becoming the second fastest selling console after Wii.

Chart 22: Top Selling Nintendo Switch game Titles Worldwide as of September 2019 (in Million)

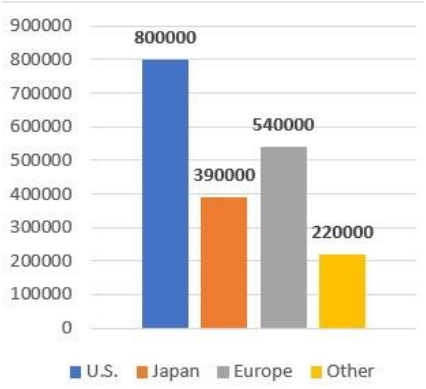


Source: VGChartz

This would have been nearly impossible if Nintendo did not launch the console with some killer exclusive titles. The Legend of Zelda: Breath of the Wild was one of the launch titles and it proved to be key to the success of Switch. The game received an average critic score of 97%, sold almost 15 million copies to date, and was the only game produced by a console major included in the Time's list (Gault, 2019) of best games of the decade (production of another entry, Pokémon Go, was licensed to a third-party developer by Nintendo). Other launch titles, 12 in total, were mostly re-releases of much older games, which prompted some journalists to call Switch a "$400 Zelda machine" (Irving, 2017).

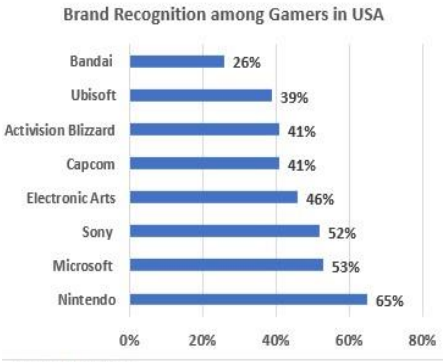
Over time, more blockbuster exclusives followed, cementing the unique value proposition of Switch (Chart 22). As these games are only available on Switch, they boost adoption with consumers, which then serves as a proof point for third-party publishers that the Switch user base is large enough to profitably port their games, which then expands the console's library even further, and so on. Therefore, Nintendo is a huge benefiter from network effects, and the evidence suggests that Switch is past the inflection point.

Chart 23: Units Sales of Nintendo´s Switch Lite in Q3 2019



Source Statista

Chart 24: Brand Recognition among Gamers in USA



Source: Statista

In September 2019 Nintendo launched Switch Lite, a handheld-only spin-off of the main console that came at a 30% discount. Despite weaker hardware and lack of the hole "switching" promise, Switch Lite sold 1.95 million units in 10 days (Chart 23). What is even more indicative of consumer adoption is the fact that 43% of buyers already owned a vanilla Switch (Webster, 2019). Some anecdotal evidence also suggests that parents increasingly use Switch as a platform for bonding with their children and buy more than one Switch per household. Nintendo also pointed out that there more female owners of Switch Lite compared to the company's other products. All of this indicates that Nintendo is successfully expanding the user base and the sales momentum for Switch is far from over. And as we saw how Nintendo successfully sold the handheld version of Switch standalone, the company can employ a similar strategy on the opposite side of the spectrum, creating a hypothetical Switch Pro that would be home-only and technologically on par with Xbox and PlayStation.

Based on Nintendo's profile and history, for our valuation we assume the following trajectory for the company going forward: Nintendo will continue innovating with its hardware and leverage its strong IP and brand recognition (Kunst, 2019) to drive sales of these products (Chart 24), and sales of Switch will maintain its positive momentum (Webster, 2019). On the technological side, we do not see Nintendo having the capabilities or the strategical will to compete in cutting edge areas such as streaming with Sony, Microsoft or Google, and expect the company to stay on the sidelines of this arms race. Although the company evaluates the opportunity of streaming (Batchelor, 2019), it is way behind the competition: Sony's PlayStation Now launched more than five years ago and counted a million users as of October 2019, while Microsoft has recently rolled out its own service, Project xCloud. The fact that the two other major companies in the streaming race are Google and Nvidia clearly shows that Nintendo, much more focused on content and experience, does not have the technological edge to compete on streaming. As for the game library subscription, similar to those of Electronic Arts and Ubisoft, our view is that repackaging the pricing around monthly fees will not produce an order of magnitude change in revenues since the success of this product will still depend on the quantity and quality of new games. For this reason and in the scope of this report, we assume that Nintendo's business model, which is producing hardware and selling software in units, will change substantially in the forecasted period. Meanwhile, the company can do much more in terms of licensing its brands, either for mobile games, movies or theme parks, although all these segments will remain non-core for Nintendo.

Valuation

Financial forecast

Revenues

As the "Dedicated video game hardware and software" division constitutes almost all of Nintendo's revenue, forecasting the performance of that unit is key to this report. The keys assumptions we make about Nintendo's revenues going forward concerns the sales of Switch. We assume that the console can sell 135 million hardware units and almost 1 billion software units over its lifecycle, with residual sales afterwards. At this level, Switch is well-positioned to become the third best-selling console ever, after PlayStation 2 and Nintendo DS – although PlayStation 4, with its 102.8 million units sold and some lifetime left ahead, remains a close competitor.

There are a few reasons we are bullish on Switch. First, Switch is both a home and a handheld console, which allows Nintendo to capture both of these segments simultaneously, although there is a sizeable overlap. In one of its investor presentations, Nintendo revealed that almost 20% of users use their Switches only as a home console and 30% only as a handheld, with the rest playing in both modes (Hulfish, 2017). To maintain the sales growth of Switch, Nintendo can follow up with updated models targeted for each of the modes: in September 2019 the company launched Nintendo Switch Lite, a handheld-only cheaper version that is now having a strong sales momentum. Following this approach, Nintendo can release another update now targeted at core gamers, with more computing power and at a higher price – a hypothetical Switch Pro. Second, although Switch is behind both PlayStation 4 and Xbox One in terms of computing power, the gap is not as large as it was in the past generations. That means that, with some limitations, many popular games from other platforms can be ported on Switch, which will attract players that are not big fans of Nintendo's first-party content. As a recent example, The Witcher 3, one of the most successful games of this generation, got a late release on Switch. While many core gamers already own the game on other platforms, some decided to buy another copy on Switch to have the opportunity to play on the go. The port was a big success, contributing to a 38% YoY revenue increase for CD Projekt, the developer and publisher of the game (CD Projekt, 2019). Third, while PlayStation 4 and Xbox One were released within a week in November 2013 and instantly entered in a fierce competition for the customer wallets, Switch was released only in March 2017, when, with no next generation in sight, gamers could more easily afford another console. Furthermore, as Sony and Microsoft

introduce the ninth generation of consoles and focus on selling hardware, Switch can fill the content gap in that transition period.

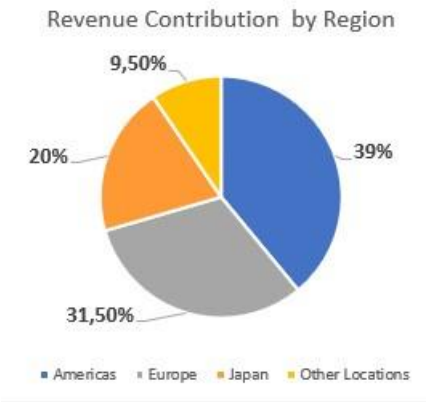
Table 6: Distributions of Switch Hardware Unit Sales

Consoles	Units Sold (m)
2017	2,740,000
2018	15,050,000
2019	16,970,00
2020E	20,071,300
2021E	21,295,235
2022E	22,889,749
2023E	23,440,741
2024E	11,912,975

Source: Nintendo´s Annual Reports; Own Estimation

For these reasons, we see the Switch platform growing up until 2023, after which we expect it to be replaced by a successor console. The exact distribution of hardware unit sales can be found in Table 6 (it is worth noting that surprisingly low sales in 2017 are explained by the fact that, according to Nintendo's methodology, the fiscal year of 2017 ends with March 2017, meaning that it includes less than one month of sales of Switch). In general, we assume that software sales on the Switch platform will follow hardware sales throughout the growth period; then the relationship will decouple with software having more inertia and thus falling slower as Switch approaches the end of its lifecycle. It is not clear how big, if any, will be the disruption of video game streaming services, but we believe that Nintendo is the incumbent most protected from it. Whereas pure software publishers such as Electronic Arts and Ubisoft face pressure to rethink their business models, Nintendo has its own, well-established distribution platform, and a heavy load of world-class IP necessary to lock customers into it. It is naïve to assume that this will be enough to fend off the challengers forever, but for the time being Nintendo has an upper hand.

Chart 25: Nintendo´s Revenue Contribution by Region

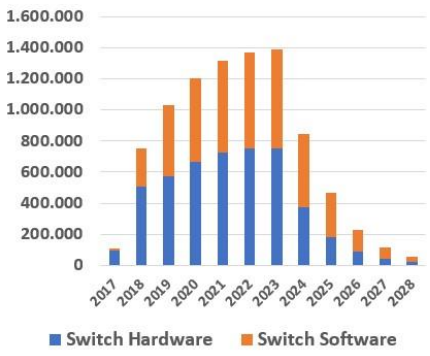


Source: Nintendo´s Annual Report 2019

As for the prices, Nintendo does not disclose the average prices it sells Switch for, so we had to rely on our own research, which showed that Japan, Nintendo's home market, has the cheapest Switch at ¥29,980, followed by Americas (32,548) and Europe (¥39,882). We expect little to no reduction until late in the console's lifetime, as the consumer demand remains strong – although we model that, due to the introduction of the cheaper Switch Lite, the aggregate price will average down. In terms of revenue contribution, the Americas is the most important geography, bringing in 39% of the Switch hardware sales (Chart 25). Europe contributes 31.5%, Japan 20%, and the rest is made up of sales in other locations. We assume no substantial changes to this structure going forward. Additionally, we expect generally flat software prices throughout a console generation: video game prices tend to be rather sticky and, as we move further into the lifecycle of Switch, higher prices of new titles (due to inflation) will be countered by more discounts on older titles.

After the new console is released, we expect both hardware and software sales of Switch to start contracting rapidly, and the fate of 3DS being replaced by Switch offers some guidance. We can see a pattern of hardware sales shrinking at about 50% a year (this is our assumption for Switch as well), while software sales decrease less rapidly as new games are still published for some time (we assume growth rates of -25%, -40%, -50% in 2024, 2025, and 2026 respectively).

Chart 26: Nintendo Switch Hardware and Software Sales



Source: Nintendo´s Annual Report; Own Estimation

As a result, during the transition period, the total revenues of the Switch platform will be driven mostly by software sales, contrary to the status quo (Chart 26).

Given that it is far too early for Nintendo to reveal any details about its follow-up for Switch, for modeling purposes we assume that the console will have sales performance similar to that of Switch, although it will launch at a slightly higher price, incorporating the costs of superior hardware and inflation. We assume that the new console will launch at a price 20% higher than what Switch was originally sold for, which represents a compounded annual inflation of 2.63% over the 6-year gap between the two events. Due to extreme uncertainty (Nintendo, has not confirmed any plans for a next-gen successor), we assume that the launch numbers to follow those of Switch for both hardware and software.

Apart from sales of the Switch family and, starting from 2023, the new console, "Dedicated video game hardware and software" contains two other categories, namely 3DS and Others. As 3DS gets completely phased out without any hardware updates and barely any new games, we assume that sales will keep falling at a rate close to the one observed in 2019 (-66.5%) until this revenue stream becomes immaterial. Nintendo does not disclose much about the Other stream, other than saying that it includes amiibo (interactive action figures), Virtual Console (a line of retro video games published on Wii, Wii U, and 3DS, but not on Switch) and platforms other than 3DS or Switch (supposedly Wii U). Given how little visibility we have on this category and the fact that most of its drivers are related to retired consoles that will not be growing anymore, we felt comfortable assuming a three-year median growth rate equal to -30%.

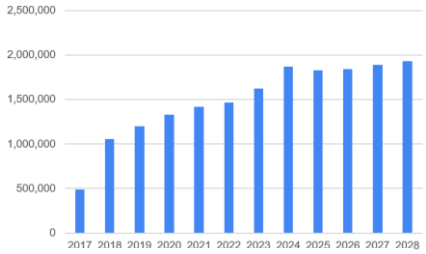
The other two divisions are "Mobile, IP related income, and others" (3.83% of total revenue in the last reported year) and "Playing cards" (0.16%). Similar to Other in the "Dedicated video game hardware and software" division, here Nintendo offers no meaningful breakdown and future guidance. A look into the company's strategic statement, however, hints that we will see more IP-related business in the future:

"For the IP expansion business, we intend to enhance the value of Nintendo IP by increasing the contact points with consumers in their everyday lives through collaborations with our corporate partners, including theme park projects, film, and merchandising."

In light of this, and the fact that Nintendo made the most downloaded iPhone game of 2019 (Webster, 2019), we believe that Nintendo can keep the fast pace of expansion (17%) in its "Mobile, IP related income, and others" division for the forecasted years. This view is supported by numerous projects in Nintendo's pipeline, including the Super Nintendo World theme park (Radulovic, 2019)

planned to be built in Japan in time for the 2020 Summer Olympics, and an upcoming Super Mario movie (BBC, 2018).

Chart 27: Nintendo overall sales, ¥ m

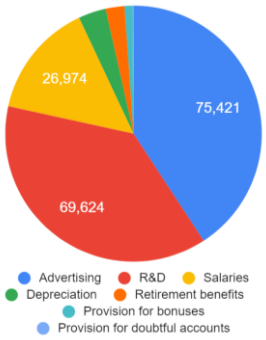


Source: Nintendo, own estimation

Aggregated revenue forecast can be found in Chart 27. It is noticeable that the revenues tip down slightly from 2024 onwards. Our rationale here is that as Switch, a massive blockbuster with consumers, will be replaced, its success will be hard to replicate and, even though we assumed the same launch figures for the next consoles, it might not be enough to offset the drop in sales of Switch. The reason we did not a similar dynamic in 2017-2018 is that preceding years of underperformance created a low base effect and helped Nintendo achieve such explosive growth (revenues grew 119% from the fiscal year 2017 to 2018) – since Switch is clearly successful, that will not be the case when the next generation comes.

Expenses

Chart 28: 2019 SG&A breakdown, ¥ m



Source: Nintendo

Nintendo has a gross margin of 41.75% in 2019, with only minor fluctuations around that number in the previous years considered. Unfortunately, Nintendo provides neither a breakdown of these costs nor any strategic initiatives on whether they plan to optimize their supply chain. For this reason, we assume a 5-year median gross margin in our forecast.

In SG&A, the three biggest categories constitute 93% of total SG&A expenses. These categories are advertising, R&D, and salaries (Chart 28). The two major constituents of SG&A are advertising expenses and R&D. Advertising is largely pro-cyclical, with costs rapidly ramping up towards the launch of a new console. In the fiscal year of 2018 (which includes 9 months of 2017, right after the launch of Switch in March 2017) advertising expenses were ¥72.6 billion compared to ¥48.7 billion the year before, representing a 50% spike, after which advertising expenses stabilize when expressed as a percentage of revenue. In our forecast, we project a similar, although not as drastic, a spike in advertising expenses in 2024, which we expect to be the first full year of sales of the new console.

R&D expenses include the development of hardware products and software for this hardware, as well as for smartphones. As is the case with many other categories in the annual report, the segment breakdown of R&D is omitted as Nintendo operates as a single business segment. For the lack of clear guidance, we assume that R&D will increase in absolute terms as Nintendo makes its way into the mobile market and catches up with competitors' in functionality of its console operating systems (while both Xbox and PlayStation have wide ranges of side apps like YouTube and Netflix, Switch does not even have a web browser) but stays on par with recent years when expressed as a percentage of revenue.

All the other lines included in SG&A were forecasted as either a 3-year or 5-year medians expressed as a percentage of revenue, depending on whether there were clear outliers.

All the other lines included in SG&A were forecasted as either a 3-year or 5-year medians expressed as a percentage of revenue, depending on whether there were clear outliers.

Working capital and CAPEX

In terms of working capital activity ratios, Nintendo's average holding period of inventory was 70.70 days in 2019, which is also the median throughout 2015-2019. The average collection period of accounts receivable was 23.77 in 2019 (5-year median of 28.02 days), while the average accounts payable period was 31.15 days in 2019 (5-year median of 63.66 days). Bringing these three metrics together, the cash conversion cycle in 2019 was equal to 63 days in 2019 (5-year median of 39 days). For most working capital components, we assumed that they will converge to their 5-year median values going forward. An exception to this rule, the payable period was projected to remain on its level 2019 level of 31.15 days, which was radically different from the years prior – 77.25 days in 2018 and 131 days in 2017. Our rationale is that the launch of Switch drastically improved the financial situation of Nintendo and allowed it to pay its suppliers earlier, which long-term will allow the company to maintain good terms with the suppliers and stabilize the supply chain. On the asset side of working capital, we noticed that both account receivables and inventories increase throughout 2018, the first full year of Switch sales. Despite this, we do not forecast any such hike during the launch of Nintendo's next console for the following reason: compared to its predecessor, Switch was (and is) a remarkable success, which led revenues to more than double in a year, and surely had a large impact on the working capital. In contrast to this, we expect the next console to have similar sales figures and, therefore, no comparable impact on the structure of working capital. It is important to note that the company has a policy in place, that states that future growth, including capital investments, cannot be funded using external capital. This principle connects to the zero debt and vast cash reserves that Nintendo has.

A separate task was to split Nintendo's cash balance between operating and excess cash. Nintendo sits on a cash pile that represents 72% of its revenues in 2019 and was proportionally as high as 141% in 2017. Unfortunately, the company does not disclose how much cash it needs to cover operational needs, so we employed an approach described by A. Damodaran in his 2005 paper "Dealing with Cash, Cross Holdings and Other Non-Operating Assets:

Approaches and Implications" (Damodaran, 2005): looking at industry benchmarks as proxies, presuming that aggregated on the industry level, there is no excess cash. To do this, we split Nintendo's revenues across two categories: software, benchmarked against the entertainment software industry, and hardware, benchmarked against consumer electronics – and then took the weighted average operating cash holdings as a percentage of revenues. The output varied throughout the years considered in the range of 14.5%-15.5%.

On the capital investments side, Nintendo uses funds mainly for R&D facilities. Meanwhile, the R&D expenditures, especially when it comes to building video game software, are so inherent to Nintendo's business that the company does not capitalize them, and instead expenses them on the P&L statement. To forecast CAPEX, we projected all major lines of PP&E, although Nintendo does not specify any major planned investments or divestitures of its fixed assets. Depending on the situation (stable trend or big fluctuations), we assumed either 5-year median, last year's, or 0% growth rate (like in case of land, which suffered an 8.5% impairment loss in 2019 but otherwise did not change meaningfully in the past years).

Discounted Cash Flow Analysis

Cost of Capital

In order to quantify Nintendo´s weighted average cost of capital (WACC), it was necessary to gather information on comparable companies, market indexes and analyze Nintendo´s Equity and Debt structure. For the risk-free rate factor, we used the 10-year Japanese Government Bond. In order to calculate Nintendo´s beta, we used weekly returns over a three-year period, from December 2016 until December 2019, from Nintendo's stock and Nikkei 225. We used a 95% confidence interval to assure the calculated beta. Our Market Risk Premium (MRP) was set as an average across mature markets since Nintendo operates globally and sourced from Aswath Damodaran (Damodaran, 2019). The regression output was Nintendo's beta of 0.98, which indicates that the company's stock is moving along with the market fluctuations (Table 7). To benchmark it against the peers, we looked at 14 major players in the video game market and found that the median levered beta for this group is 0.82, with the median unlevered beta being 0.71 (Table 8). In both cases, Nintendo's beta turns out to be higher (relevering with Nintendo's D/E of 0 yields the same result). With the exception of Square Enix, Nintendo had the highest unlevered beta across all its peers, with only Sony coming close (0.96). Although we are constrained by the small sample group, such result might indicate that pure software publishers, like Konami, and Capcom in Japan or Electronic Arts and Ubisoft in the West, are

Table 7: Regression on beta output

Parameter	Value
Coefficient	0.9785
R-square	0.214
95% CI, lower	0.68
95% CI, upper	1.28
P-value	1.156E-09

Source: Own Estimation

Table 8: Betas across peers

Comparables		
Company	**Levered Beta**	**Unlevered Beta**
Square Enix	1.03	1.00
Konami	0.83	0.79
Capcom	0.52	0.49
Bandai Namco	0.51	0.51
Nexon	0.85	0.84
Electronic Arts	0.63	0.55
Activision Blizzard	0.81	0.68
Take-Two Interactive	0.73	0.73
Ubisoft	0.70	0.35
NetEase	0.93	0.74
Tencent	1.40	0.96
Sega Sammy	0.65	0.55
Sony	1.16	0.92
Microsoft	1.09	0.67
Median	**0.82**	**0.71**

Source: Reuters

inherently less risky (i.e. have lower betas) than platform holders like Nintendo and Sony, which produce both software and hardware. It is likely the hardware, both expensive and non-essential for a household, which takes a bigger hit during economic downturns and, therefore, creates additional risk.

In order to establish Nintendo´s Capital Structure, we assumed a target D/E ratio of 0, historically, Nintendo does not have Debt. The company does not provide evidence that would change its capital structure soon, and it is one of its corporate principles that all new projects are financed with internal capital. Since Nintendo does not have any long-term and short-term bonds outstanding, we assumed book values are equal to market values. We assumed a tax rate of 30.5%, which is the statutory tax rate. We used the CAPM formula to calculate Nintendo´s Cost of Equity and obtained 6.71%. As the company D/E ratio is 0, we arrived at a WACC of 6.71%.

Forecasting Free Cash Flows

Our next step was to conduct a Discounted Cash Flow analysis to value Nintendo. As Nintendo's performance tends to have major fluctuations depending on where we are in the console's lifecycle, our intention was to make the detailed forecast up to the point where the free cash flows stabilize – we believe that such trend will become more visible as the Switch gets phased out in favor of a new console. For this reason, we have made detailed forecasts up to 2028, after which we have assumed a terminal growth rate. In order to establish the terminal growth rate, we used the GDP growth rates of four Nintendo's key geographies: Japan, America (implying the US since it stands for 87% of Nintendo's sales in the region), Europe, and Other (for which we took the global GDP growth rate). These rates were weighted by their share in the overall net sales of Nintendo (Table 9). The output terminal growth rate amounted to 2.23%, which is consistent with the 2028 projected growth of 2.16% in core income and 2.37% in free cash flow. As an alternative to assuming a terminal growth rate, we also calculate the terminal value using an EV/EBITDA multiple, which stands at 14.66 in the peer group.

Table 9: Terminal growth breakdown

	GDP growth	% of revenues
Japan	0.79%	22.13%
Americas/US	2.93%	44.05%
Europe	2.02%	25.37%
Other/World	2.97%	8.45%
Weighted avg	2.23%	

Source: Own Estimation

Although most risk factors disclosed in the annual report are too generic to price in – e.g. fluctuation of market environment, dependency on outside manufacturers – there is one particular development that is easily quantifiable. In 2019, law firm Chimicles Schwartz Kriner & Donaldson-Smith filed a class action lawsuit in the US against Nintendo, stating that the Switch controllers (Joy-Cons) are defective. So far, there is mostly anecdotal evidence, although a survey suggests that as many as 37% of Joy-Cons are defective (reddit, 2019). For the purposes of this valuation, we assume a 10% probability that the court will force

Nintendo to either replace the defective Joy-Cons or repay its cost in cash. Knowing that a pair of Joy-Cons costs Nintendo $90 to produce, slightly above the retail price (Kinsley, 2017), we estimated a probability-weighted adverse impact of the litigation at ¥36.1 billion, paid out in the fiscal year 2024, as most class action cases take around three years to resolve (Table 10).

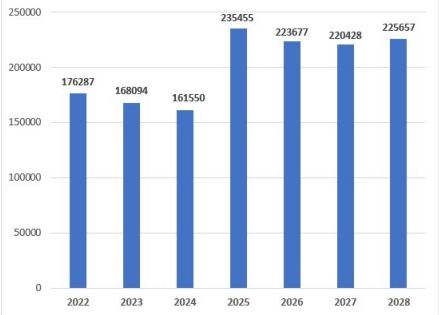
Table 10: Terminal growth breakdown

# of Switch sold by 2023	99,646,284
# of Joy Cons per Switch	2
Failure rate	37%
# of Joy Cons at risk	73,738,250
% who will claim replacem	10%
Cost of replacement	4,895
Impact of lawsuit loss (m)	36,095

Source: reddit, NintendoToday, own estimation

Before proceeding to the projected share price, it is important to elaborate on how Nintendo views a fiscal year. Nintendo's fiscal years are shifted compared to calendar years and are also forward-looking – e.g. the fiscal year 2019 ends in March 2019. Although Nintendo publishes quarterly results, they are not as detailed as their annual reports and, if we were to cut the fiscal year to maintain the proposed valuation date of 31st of December 2020, our forecast would lack the depth we believe it deserves. Therefore, this valuation is dated as of 31st of March 2021 – the month concluding the fiscal year that included 9 out of 12 calendar months in 2020.

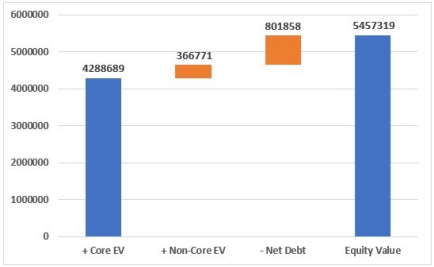
Chart 29: FCF forecast, ¥ m



Source: own estimation

We forecasted the company´s future performance up to the point where its revenues, ROIC, and free cash flows have all stabilized (Chart 29). Discounting the future cash flows of the core business and the terminal value with the prior computed WACC of 6.71%, we obtained a core enterprise value of ¥4,288 billion. Adding the non-core enterprise value to the core enterprise value we achieved a total enterprise value of ¥4,655 billion. Adding the Net Financial Assets to the total enterprise value leads to an Equity Value of ¥5,457 Billion (Chart 30). Assuming 131.669 million shares outstanding in 2022, the corresponding share price is ¥41,447.26. If we were to use a terminal value based on EV/EBITDA, as described above, the share price would be slightly lower at ¥40,439.72 As for the dividends, we forecast that Nintendo will pay out a dividend of ¥476.7 per share in 2020 and ¥512.2 in 2021.

Chart 30: EV to Equity Value bridge, ¥ m



Source: own estimation

To see how changes in key value drivers affect valuation, we conducted a sensitivity analysis, presented in Table 11.

Table 11: Sensitivity Analysis

Fair Value of Equity		WACC				
		7,84%	7,34%	6,84%	6,34%	5,84%
Perpetual growth	1,73%	4.371.969	4.665.291	5.119.825	5.443.262	5.974.449
	1,98%	4.471.192	4.786.773	5.280.545	5.635.471	6.224.924
	2,23%	4.579.257	4.920.137	5.457.319	5.851.052	6.510.073
	2,48%	4.697.398	5.067.216	5.658.967	6.094.543	6.837.630
	2,73%	4.827.095	5.230.241	5.883.826	6.371.742	7.217.817

		Total Switch Sales				
		125.000.000	130.000.000	135.000.000	140.000.000	145.000.000
Cost of sales	63,33%	3.966.158	4.192.531	4.418.904	4.645.277	4.871.650
	61,33%	4.467.285	4.702.939	4.938.593	5.174.247	5.409.901
	59,33%	4.968.411	5.213.346	5.457.319	5.703.217	5.948.152
	57,33%	5.469.537	5.723.754	5.977.970	6.232.187	6.486.403
	55,33%	5.970.663	6.234.161	6.497.659	6.761.157	7.024.654

Source: own estimation

One of the key insights here is that optimizing WACC can unlock lots of additional value, as a 1 percentage point decrease in WACC increases equity value by 19.3%. Given than the median WACC in the industry is 5.91% across the industry and 4.26% across Japanese peers, Nintendo can likely bring its WACC of 6.71% down by adding some debt into the equation. Similar results can be achieved if Nintendo manages to bring its cost of sales down from 59% to 55%, although this seems like a more challenging goal. Overall, different combinations of WACC and terminal growth yield equity values from ¥4,372 billion to ¥7,218 billion, while different levels of cost of sales and Switch lifecycle sales produce a range of ¥3,966 billion to ¥7,024 billion. This output also serves as a scenario analysis, as it shows how the recommendation would change based on value drivers. Equity values above ¥5,722 billion represent at least a "Hold" recommendation, while values above ¥6,294 billion represent "Buy".

Comparables

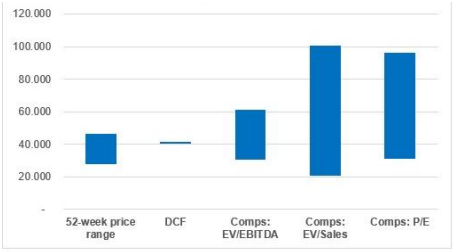
After using the DCF method to value and analyze Nintendo, we performed a relative valuation against the same peer group used in the Cost of Capital section, in order to validate our results. We compared them across the most significant multiples: EV/Revenue, EV/EBITDA, P/E, and P/B (Table 12). At its current share price, Nintendo appears more expensive across all four multiples, although still in the ballpark of the median values. One possible explanation could be the dividend yield, which at 2.07% is almost triple the peer median of 0.74%. With the share price obtained through DCF, Nintendo's multiples would still be above the peer median for EV/EBITDA and P/E, but below it for EV/Sales and P/B.

Table 12: Nintendo Peer Group Multiples

Company Name	EV / Revenue	EV / EBITDA	P / E	P / B
Median	3,86	14,66	23,43	3,55
Nintendo Co Ltd	3,87	16,65	27,54	3,78
Square Enix Holdings Co Ltd	1,97	14,58	31,10	3,04
Konami Holdings Corp	1,99	7,86	18,77	2,20
Capcom Co Ltd	3,83	14,73	20,87	3,38
Bandai Namco Holdings Inc	1,74	11,83	22,81	3,37
Nexon Co Ltd	4,65	11,33	10,96	2,12
Electronic Arts Inc	5,41	21,29	24,05	4,40
Activision Blizzard Inc	6,30	15,82	25,83	3,73
Take-Two Interactive Software Inc	3,88	22,11	20,82	6,35
Ubisoft Entertainment SA	4,43	11,87	39,27	6,42
NetEase Inc	3,52	15,45	21,16	4,31
Tencent Holdings Ltd	9,31	25,60	38,48	7,94
Sega Sammy Holdings Inc	1,11	9,79	63,22	1,24
Sony Corp	1,04	6,58	10,91	2,33
Microsoft Corp	8,81	19,86	31,60	11,35

Source:Thomson Reuters

Chart 31: Nintendo's indicative share price



Source: Own Estimation

Valuation ranges suggested by relative valuation, contrasted with DCF and actual share price fluctuations, are presented in Chart 31. For these ranges, low and high values were determined by taking the respective quartiles of the peer group.

Given that our recommendation is based on the share price obtained through the DCF, we conclude that Nintendo's current share price of ¥43,970 is above the fair price of ¥41,447.26 and, therefore, our recommendation is SELL.

Appendix

Income Statement

All numbers in million yen

Reformulated statement	3/2015	3/2016	3/2017	3/2018	3/2019	3/2020	3/2021	3/2022	3/2023	3/2024	3/2025	3/2026	3/2027	3/2026
Core														
Net Sales	549.780	504.457	489.093	1.055.680	1.200.558	1.326.140	1.420.000	1.467.330	1.623.581	1.870.552	1.830.088	1.843.817	1.886.577	1.927.360
Dedicated video game hardware/software	548.643	497.146	463.129	1.014.631	1.152.601	1.270.299	1.354.942	1.391.496	1.535.147	1.767.383	1.709.687	1.703.263	1.722.452	1.735.665
Mobile, IP related income, etc.	0	5.734	24.250	39.320	46.008	53.834	62.990	73.704	86.241	100.910	118.073	138.157	161.656	189.152
Playing cards, etc.	1.137	1.577	1.714	1.729	1.949	2.007	2.068	2.130	2.194	2.259	2.327	2.397	2.469	2.543
Cost of sales	335.196	283.494	290.197	652.141	699.370	786.848	842.538	870.621	963.331	1.109.868	1.085.859	1.094.005	1.119.376	1.143.574
Cost of sales as % of Sales	*60,97%*	*56,20%*	*59,33%*	*61,77%*	*58,25%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*	*59,33%*
Gross Profit	214.584	220.963	198.896	403.539	501.188	539.292	577.461	596.709	660.250	760.684	744.229	749.812	767.201	783.786
Gross margin	*39,03%*	*43,80%*	*40,67%*	*38,23%*	*41,75%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*	*40,67%*
Selling, general and administrative expenses	189.814	188.083	169.535	225.983	251.488	282.719	300.357	311.405	343.503	414.326	405.625	408.767	418.256	427.320
Advertising expenses	54.834	46.636	48.726	72.616	75.421	87.265	91.324	95.462	105.022	140.291	137.257	138.286	141.493	144.552
Advertising expenses as % of Sales	*9,97%*	*9,24%*	*9,96%*	*6,88%*	*6,28%*	*6,58%*	*6,43%*	*6,51%*	*6,47%*	*7,50%*	*7,50%*	*7,50%*	*7,50%*	*7,50%*
R&D	63.296	69.064	59.171	63.999	69.624	78.651	84.218	87.025	96.292	110.939	108.539	109.354	111.890	114.308
R&D as % of Sales		*13,69%*	*12,10%*	*6,06%*	*5,80%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*	*5,93%*
Salaries, allowances and bonuses	21.713	22.282	20.471	24.993	26.974	31.396	33.618	34.739	38.438	44.285	43.327	43.652	44.664	45.630
Salaries, allowances and bonuses as % of Sales	*3,95%*	*4,42%*	*4,19%*	*2,37%*	*2,25%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*	*2,37%*
Depreciation	5.762	6.137	5.325	5.146	6.418	5.247	5.364	5.485	5.611	5.743	5.880	6.023	6.172	6.328
Depreciation, % of PP&E	*6,30%*	*6,99%*	*6,15%*	*6,13%*	*7,87%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*	*6,30%*
Retirement benefits expenses	6.408	3.476	192	3.692	4.397	4.898	5.244	5.419	5.996	6.908	6.759	6.810	6.968	7.118
Retirement benefits expenses as % of salaries	*29,51%*	*15,60%*	*0,94%*	*14,77%*	*16,30%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*	*15,60%*
Provision for bonuses	647	635	590	1.178	1.879	1.600	1.713	1.770	1.959	2.256	2.208	2.224	2.276	2.325
Provision for bonuses expenses as % of Sales	*0,12%*	*0,13%*	*0,12%*	*0,11%*	*0,16%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*	*0,12%*
Provision of allowance for doubtful accounts	407	48	(94)	(5)	202	126	135	140	154	178	174	175	180	183
Provision of allowance for doubtful accounts as % of Sales	*0,07%*	*0,01%*	*-0,02%*	*0,00%*	*0,02%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*	*0,01%*
Other	36.747	39.805	35.154	54.364	66.573	73.537	78.741	81.366	90.030	103.725	101.481	102.243	104.614	106.875
Other as % of sales	*6,68%*	*7,89%*	*7,19%*	*5,15%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*	*5,55%*
Operating Profit	24.770	32.880	29.361	177.556	249.700	256.572	277.104	285.304	316.748	346.358	338.604	341.045	348.944	356.466
Operating margin	*4,51%*	*6,52%*	*6,00%*	*16,82%*	*20,80%*	*19,35%*	*19,51%*	*19,44%*	*19,51%*	*18,52%*	*18,50%*	*18,50%*	*18,50%*	*18,50%*
Sales Discounts	205	106	3	0	0	0	0	0	0	0	0	0	0	0
Foreign exchange gains (losses)	34.051	(18.356)	(5.256)	(766)	5.426	(962)	(1.030)	(1.065)	(1.178)	(1.357)	(1.328)	(1.338)	(1.369)	(1.398)
Foreign exchange gains (losses) as % of Sales	*6,19%*	*-3,64%*	*-1,07%*	*-0,07%*	*0,45%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*	*-0,07%*
Core Result before Taxes	58.616	14.418	24.102	176.790	255.126	255.610	276.073	284.239	315.570	345.001	337.276	339.707	347.575	355.067
Taxes attributed to Core business	24.560	5.825	2.555	52.876	72.456	82.498	89.103	91.738	101.850	111.349	108.856	109.640	112.180	114.598
Core Result after Taxes	34.056	8.593	21.547	123.914	182.670	173.112	186.971	192.501	213.720	233.652	228.420	230.066	235.395	240.469
Non-core														
Non-operating income														
Interest income	4.018	4.693	6.237	9.064	13.131	6.974	6.974	6.974	6.974	6.974	6.974	6.974	6.974	6.974
Interest income, % of investment	*4,17%*	*3,73%*	*3,95%*	*4,57%*	*7,86%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*	*4,17%*
Gain (loss) on redemption of securities	5.233	6.801	(2.199)	(794)	(440)	1.720	1.720	1.720	1.720	1.720	1.720	1.720	1.720	1.720
Share of profit of entities accounted for using equity method	952	1.887	20.271	10.318	6.949	8.075	8.075	8.075	8.075	8.075	8.075	8.075	8.075	8.075
Gain on sales of non-current assets	47	9	185	821	1	213	246	293	315	213	256	265	268	263
Gain on sales of investment securitites	0	398	64.589	490	0	0	0	0	0	0	0	0	0	0
Gain on sales of shares of subsidiaries	3.689	0	0	0	0	0	0	0	0	0	0	0	0	0
Reversal of loss on litigation	0	0	0	1.929	0	0	0	0	0	0	0	0	0	0
Impairment loss	0	0	0	0	(4.622)	0	0	0	0	0	0	0	0	0
Loss on disposal of non-current assets	(446)	(351)	(328)	(366)	(278)	(354)	(354)	(354)	(354)	(354)	(354)	(354)	(354)	(354)
Loss on sales of investment securities	0	0	0	(2)	0	0	0	0	0	0	0	0	0	0
Loss on valuation of investment securitites	0	0	0	0	(682)	0	0	0	0	0	0	0	0	0
Restructuring loss	(1.729)	(1.130)	(80)	0	0	0	0	0	0	0	0	0	0	0
Loss on litigation	0	0	0	(1.138)	0	0	0	0	0	0	0	0	0	0
Other	1.711	990	1.952	3.976	2.586	2.243	2.243	2.243	2.243	2.243	2.243	2.243	2.243	2.243
Non Core Result before Taxes	13.475	13.297	90.627	24.298	16.645	18.871	18.904	18.952	18.973	18.872	18.915	18.923	18.927	18.922
Taxes attributed to Non Core business	5.646	5.372	9.606	7.267	4.727	6.091	6.101	6.117	6.124	6.091	6.105	6.107	6.109	6.107
OCI (net of taxes)	17.509	(20.206)	1.942	(6.854)	5.773	287	287	287	287	287	287	287	287	287
Non Core Result after Taxes	25.338	(12.281)	82.963	10.177	17.691	13.068	13.090	13.122	13.137	13.068	13.097	13.103	13.105	13.102
Profit Before Taxes	72.091	27.715	114.729	201.088	271.771	274.482	294.978	303.191	334.543	363.873	356.190	358.630	366.502	373.989
Total Income Taxes	30.206	11.197	12.161	60.143	77.183	88.589	95.204	97.855	107.974	117.440	114.960	115.748	118.289	120.705
Comprehensive income	59.394	(3.688)	104.510	134.091	200.361	186.180	200.061	205.623	226.856	246.720	241.517	243.169	248.501	253.571

Balance Sheet

All numbers in million yen

Reformulated statement	3/2015	3/2016	3/2017	3/2018	3/2019	3/2020	3/2021	3/2022	3/2023	3/2024	3/2025	3/2026	3/2027	3/2028
Core														
Assets														
Current assets														
Operating cash	83.237	76.708	72.644	153.536	175.660	193.931	207.538	214.497	236.744	272.929	268.615	270.149	276.243	282.261
Operating cash as Percentage of Sales	15,14%	15,21%	14,85%	14,54%	14,63%	14,62%	14,62%	14,62%	14,58%	14,59%	14,68%	14,65%	14,64%	14,64%
Notes and accounts receivable - trade	55.794	38.731	106.054	69.829	78.169	101.818	109.024	112.658	124.655	143.617	140.510	141.564	144.847	147.978
Average Collection Period	37,04	28,02	79,15	24,14	23,77	28,02	28,02	28,02	28,02	28,02	28,02	28,02	28,02	28,02
Inventories	76.897	40.433	39.129	141.795	135.470	152.415	163.202	168.642	186.600	214.985	210.334	211.912	216.826	221.514
Holding Period	83,73	52,06	49,22	79,36	70,70	70,70	70,70	70,70	70,70	70,70	70,70	70,70	70,70	70,70
Deferred tax assets	15.597	6.597	332	0	0	0	0	0	0	0	0	0	0	0
Allowance for doubtful accounts	(451)	(369)	(379)	(87)	(82)	(364)	(390)	(403)	(445)	(513)	(502)	(506)	(518)	(529)
Allowance for doubtful accounts as Percentage of Receivables	-0,81%	-0,95%	-0,36%	-0,12%	-0,10%	-0,36%	-0,36%	-0,36%	-0,36%	-0,36%	-0,36%	-0,36%	-0,36%	-0,36%
Total current assets	231.074	162.100	217.780	365.073	389.217	447.800	479.375	495.395	547.553	631.017	618.956	623.119	637.398	651.224
Non-current assets														
PP&E	91.486	87.750	86.556	83.924	81.548	83.307	85.160	87.081	89.089	91.179	93.360	95.633	98.003	100.474
Intangible assets	12.431	9.977	12.825	14.020	14.090	14.378	14.802	15.260	15.764	16.339	16.976	17.671	18.421	19.230
Investments and other assets														
Deferred tax assets	30.558	32.195	49.453	47.654	57.992	68.367	72.492	75.014	82.494	89.877	87.905	88.545	90.469	92.327
Deferred tax assets as Percentage of Taxes	101,09%	287,56%	407,09%	79,23%	75,11%	77,17%	76,14%	76,66%	76,40%	76,53%	76,47%	76,50%	76,48%	76,49%
Retirement benefit asset	9.174	7.092	7.680	7.931	7.056	9.993	10.700	11.057	12.234	14.095	13.790	13.894	14.216	14.523
Retirement benefit asset as Percentage of Salaries	42,25%	31,83%	37,52%	31,73%	26,16%	31,83%	31,83%	31,83%	31,83%	31,83%	31,83%	31,83%	31,83%	31,83%
Allowance for doubtful accounts	0	0	0	(30)	(29)	0	0	0	0	0	0	0	0	0
Total assets	374.723	299.114	374.295	518.572	549.874	623.844	662.529	683.806	747.134	842.506	830.988	838.860	858.508	877.778
Liabilities														
Current liabilities														
Notes and accounts payable - trade	58.464	31.857	104.181	138.015	59.689	67.155	71.908	74.305	82.217	94.724	92.675	93.370	95.535	97.600
Payable Period	63,66	41,02	131,04	77,25	31,15	31,15	31,15	31,15	31,15	31,15	31,15	31,15	31,15	31,15
Income taxes payable	16.529	1.878	11.267	43.390	62.646	63.911	68.684	70.596	77.896	84.725	82.937	83.505	85.338	87.081
Income tax payable as Percentage of Taxes	54,68%	16,77%	92,75%	72,14%	81,14%	72,14%	72,14%	72,14%	72,14%	72,14%	72,14%	72,14%	72,14%	72,14%
Provision for bonuses	2.220	2.294	2.341	3.217	3.891	3.590	3.844	3.973	4.396	5.064	4.955	4.992	5.108	5.218
Provision for bonuses as Percentage of Salaries	10,22%	10,30%	11,44%	12,87%	14,43%	11,44%	11,44%	11,44%	11,44%	11,44%	11,44%	11,44%	11,44%	11,44%
Total current liabilities	77.213	36.029	117.789	184.622	126.226	134.656	144.436	148.873	164.509	184.513	180.566	181.866	185.980	189.899
Non-current liabilities														
Net defined benefit liability	25.416	23.546	19.245	16.609	15.068	17.538	18.780	19.405	21.472	24.738	24.203	24.385	24.950	25.489
Net defined benefit liability as Percentage of Salaries	117,05%	105,67%	94,01%	66,45%	55,86%	55,86%	55,86%	55,86%	55,86%	55,86%	55,86%	55,86%	55,86%	55,86%
Total liabilities	102.629	59.575	137.034	201.231	141.294	152.195	163.216	168.279	185.981	209.251	204.769	206.251	210.930	215.389
Core net assets	272.094	239.539	237.261	317.341	408.580	471.649	499.313	515.528	561.153	633.255	626.220	632.610	647.578	662.390
Non Core														
Assets														
Current assets														
Securities	380.587	338.892	283.307	243.431	238.410	238.410	238.410	238.410	238.410	238.410	238.410	238.410	238.410	238.410
Other current assets	34.467	26.402	49.536	66.406	48.454	83.139	89.023	91.990	101.786	117.269	114.732	115.593	118.274	120.831
Other	6,27%	5,23%	10,13%	6,29%	4,04%	6,27%	6,27%	6,27%	6,27%	6,27%	6,27%	6,27%	6,27%	6,27%
Non-current assets														
Investment securities	96.294	125.774	157.963	198.538	167.134	167.134	167.134	167.134	167.134	167.134	167.134	167.134	167.134	167.134
Other non-current assets	15.399	12.975	13.754	15.504	17.537	17.537	17.537	17.537	17.537	17.537	17.537	17.537	17.537	17.537
Total assets	526.747	504.043	504.560	523.879	471.535	506.220	512.104	515.071	524.867	540.350	537.813	538.674	541.355	543.912
Liabilities														
Current liabilities														
Other current liabilities	67.017	62.406	66.318	93.452	118.781	124.300	136.795	139.444	155.350	178.372	174.811	175.973	180.130	183.985
Other as Percentage of Sales	12,19%	12,37%	13,56%	8,85%	9,89%	9,37%	9,63%	9,50%	9,57%	9,54%	9,55%	9,54%	9,55%	9,55%
Non-current liabilities														
Other non-current liabilities	15.739	14.016	14.650	15.213	15.427	15.427	15.427	15.427	15.427	15.427	15.427	15.427	15.427	15.427
Total liabilities	82.756	76.422	80.968	108.665	134.208	139.727	152.222	154.871	170.777	193.799	190.238	191.400	195.557	199.412
Accumulated other comprehensive income														
Total accumulated other comprehensive income	6.867	(13.341)	(11.399)	(18.334)	(12.549)	(12.262)	(11.975)	(11.688)	(11.401)	(11.114)	(10.827)	(10.540)	(10.253)	(9.966)
Non-controlling interests	110	124	132	4.540	5.086	5.086	5.086	5.086	5.086	5.086	5.086	5.086	5.086	5.086
Non Core net assets	437.014	440.838	434.859	429.008	344.790	373.669	366.771	366.802	360.405	352.579	353.316	352.729	350.965	349.380
Core & Non Core net assets	709.108	680.377	672.120	746.349	753.370	845.318	866.085	882.330	921.559	985.834	979.536	985.338	998.542	1.011.769
Financial														
Excess Cash	458.532	480.610	578.924	574.324	658.546	690.011	801.858	921.914	1.033.061	1.132.329	1.298.721	1.454.108	1.605.628	1.760.485
Borrowings	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net financial assets	458.532	480.610	578.924	574.324	658.546	690.011	801.858	921.914	1.033.061	1.132.329	1.298.721	1.454.108	1.605.628	1.760.485
Shareholders' equity														
Total shareholders' equity	1.167.640	1.160.987	1.251.044	1.320.673	1.411.916	1.535.329	1.667.943	1.804.244	1.954.620	2.118.163	2.278.257	2.439.446	2.604.170	2.772.254
Summary Table														
Core Invested Capital	272.094	239.539	237.261	317.341	408.580	471.649	499.313	515.528	561.153	633.255	626.220	632.610	647.578	662.390
Fixed, Intangible and Financial Assets	103.917	97.726	99.381	97.944	95.638	97.684	99.962	102.340	104.853	107.518	110.336	113.303	116.424	119.704
Working Capital & Others	168.177	141.812	137.879	219.397	312.942	373.965	399.352	413.187	456.300	525.737	515.883	519.306	531.153	542.685
Total Non Core Invested Capital	437.014	440.838	434.859	429.008	344.790	373.669	366.771	366.802	360.405	352.579	353.316	352.729	350.965	349.380
Net Financial Assets	458.532	480.610	578.924	574.324	658.546	690.011	801.858	921.914	1.033.061	1.132.329	1.298.721	1.454.108	1.605.628	1.760.485

Statement of Equity

Reformulated statement	3/2015	3/2016	3/2017	3/2018	3/2019	3/2020	3/2021	3/2022	3/2023	3/2024	3/2025	3/2026	3/2027	3/2026
Beginning Balance	1.120.110	1.167.640	1.160.987	1.251.044	1.320.673	1.411.916	1.535.329	1.667.943	1.804.244	1.954.620	2.118.163	2.278.257	2.439.446	2.604.170
Dividends	(11.837)	(24.910)	(14.415)	(64.868)	(78.081)	(62.767)	(67.447)	(69.322)	(76.480)	(83.177)	(81.423)	(81.980)	(83.777)	(85.487)
Share Issues and Repurchases	(27)	21.945	(38)	407	(31.037)	0	0	0	0	0	0	0	0	0
Net transactions with shareholders	(11.864)	(2.965)	(14.453)	(64.461)	(109.118)	(62.767)	(67.447)	(69.322)	(76.480)	(83.177)	(81.423)	(81.980)	(83.777)	(85.487)
Net Income	34.056	8.593	21.547	123.914	182.670	173.112	186.971	192.501	213.720	233.652	228.420	230.066	235.395	240.469
Other Comprehensive Income	25.338	(12.281)	82.963	10.177	17.691	13.068	13.090	13.122	13.137	13.068	13.097	13.103	13.105	13.102
Total Comprehensive Income	59.394	(3.688)	104.510	134.091	200.361	186.180	200.061	205.623	226.856	246.720	241.517	243.169	248.501	253.571
Ending Balance	1.167.640	1.160.987	1.251.044	1.320.673	1.411.916	1.535.329	1.667.943	1.804.244	1.954.620	2.118.163	2.278.257	2.439.446	2.604.170	2.772.254
Payout ratio	*19,98%*	*-80,40%*	*13,83%*	*48,07%*	*54,46%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*
Dividend payout ratio	*19,93%*	*-675,46%*	*13,79%*	*48,38%*	*38,97%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*	*33,71%*

Statement of Cash Flows

All numbers in million yen

Reformulated statement	3/2015	3/2016	3/2017	3/2018	3/2019	3/2020	3/2021	3/2022	3/2023	3/2024	3/2025	3/2026	3/2027	3/2026
Core Business														
Core Result after Taxes	34.056	8.593	21.547	123.914	182.670	173.112	186.971	192.501	213.720	233.652	228.420	230.066	235.395	240.469
Depreciation	5.762	6.137	5.325	5.146	6.418	5.247	5.364	5.485	5.611	5.743	5.880	6.023	6.172	6.328
Core Operational Cash Flow	39.818	14.730	26.872	129.060	189.088	178.359	192.334	197.985	219.331	239.394	234.300	236.090	241.568	246.797
Core Invested Capital - Fixed Assets	103.917	97.726	99.381	97.944	95.638	97.684	99.962	102.340	104.853	107.518	110.336	113.303	116.424	119.704
CAPEX		54	(6.980)	(3.709)	(4.112)	(7.293)	(7.641)	(7.863)	(8.124)	(8.407)	(8.699)	(8.990)	(9.293)	(9.608)
Core Invested Capital - NWC and Others	168.177	141.812	137.879	219.397	312.942	373.965	399.352	413.187	456.300	525.737	515.883	519.306	531.153	542.685
Core Investment in NWC and Others		26.364	3.933	(81.518)	(93.544)	(61.023)	(25.387)	(13.836)	(43.113)	(69.437)	9.854	(3.423)	(11.847)	(11.532)
Core Investing Cash Flow		26.418	(3.047)	(85.227)	(97.657)	(68.316)	(33.027)	(21.699)	(51.237)	(77.844)	1.155	(12.413)	(21.140)	(21.140)
Core FCF		41.148	23.825	43.833	91.432	110.042	159.307	176.287	168.094	161.550	235.455	223.677	220.428	225.657
Non Core Business														
Non Core Result	25.338	(12.281)	82.963	10.177	17.691	13.068	13.090	13.122	13.137	13.068	13.097	13.103	13.105	13.102
Non Core Invested Capital	437.014	440.838	434.859	429.008	344.790	373.669	366.771	366.802	360.405	352.579	353.316	352.729	350.965	349.380
Investment Cash Flow		(3.824)	5.979	5.851	84.218	(28.879)	6.898	(31)	6.397	7.826	(737)	588	1.764	1.585
Non-Core Free Cash Flow		(16.105)	88.942	16.028	101.909	(15.811)	19.988	13.091	19.534	20.894	12.360	13.690	14.869	14.687
Core + Non Core Free Cash Flow		25.043	112.767	59.861	193.341	94.231	179.294	189.378	187.627	182.444	247.815	237.367	235.297	240.344
Financing														
Net financial assets	458.532	480.610	578.924	574.324	658.546	690.011	801.858	921.914	1.033.061	1.132.329	1.298.721	1.454.108	1.605.628	1.760.485
Investment in net financial assets		(22.078)	(98.314)	4.600	(84.223)	(31.464)	(111.848)	(120.056)	(111.147)	(99.267)	(166.392)	(155.387)	(151.520)	(154.857)
Net Cash Transaction with Shareholders		(2.965)	(14.453)	(64.461)	(109.118)	(62.767)	(67.447)	(69.322)	(76.480)	(83.177)	(81.423)	(81.980)	(83.777)	(85.487)
Financing Cash Flow		(25.043)	(112.767)	(59.861)	(193.341)	(94.231)	(179.294)	(189.378)	(187.627)	(182.444)	(247.815)	(237.367)	(235.297)	(240.344)

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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Video game sales: an empirical evaluation of key drivers

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Abstract

The business of video games is often described as hit-driven, which creates a lot of uncertainty for companies, particularly on the topics of earnings and return on investments. This paper attempts to shed some light on the features shared by video game best-sellers and find whether games published by Nintendo are more popular with the consumers.

Keywords: video game sales, Nintendo, Switch

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Throughout this equity report, we have repeatedly stated that the video game market is largely hit-driven and that producing such hits is key to the financial well-being of market participants. In the individual part of this report, I decided to look deeper into what kind of games become hits to see if it could offer any guidance in terms of maximizing the return on R&D investments. It is particularly important at a time when the production budgets are surpassing those of blockbuster movies (Call of Duty: Modern Warfare 3 cost $250 million to produce and promote), which increases the cost of failure.

For this task, I worked on a dataset parsed from VGChartz (Alqunber, 2019), a major source of video game sales data. Although the data spanned from the 1980s, I decided to set cut off all data entries prior to 2000, the year that marked the start of the sixth generation of consoles and, even more importantly, the competition of Nintendo, Sony and Microsoft we know today. After cleaning the data, I was left with 4,275 data instances.

I chose the software units sold globally as the dependent variable. The control variables were grouped across the following categories:

- **Average score**. This variable reflects the average review rating of a particular game. Where it was possible, its value was calculated as the average between the critic score and the user score. In some cases these two scores are quite different: it is worth mentioning that video game publishers usually have warm relationship with the press, giving the latter early access to the games not yet released and paying the costs of attending video game conferences, all of which incentivizes video game journalists to keep the publishers satisfied with their coverage. My initial hypothesis with this variable was that games with better reviews sell more, although there exist some niche games that are highly rated by a small group of fans, yet these games remain largely unknown to masses.
- **Genre**. Genres exist in all types of media, from music to movies, but one can argue that differentiation is highest in games. For example, whereas most genres in movies differ substantially in tone and style, they still fit under the same set of rules: roughly two hours of screen time, three acts, etc. In contrast, in video games, a blockbuster adventure title can last for 8 hours and feature numerous movie-like scenes with high-definition graphics and a heavy focus on character development, while a JRPG

(Japanese role-playing games) can pack up to 100 hours or relatively similar, repetitive gameplay with little to no dialogues. Yet both of these genres, which seem to be on the opposite extremes, have large fan bases. Still, my initial hypothesis with this variable was that action-packed, cinematic titles would sell better as they seem to be the centerpiece of marketing campaigns of the console manufacturers (Sony boasts franchises like Uncharted and The Last of Us, while Microsoft has Halo and Gears of War, and both platforms actively promote Call of Duty games).

- **Platform**. This variable controls for the console on which a game was released. This is important to consider because the hardware that sells poorly enters a vicious circle where a small user base demotivates game developers from publishing a game for this platform. This then leads to a scarcity of games on such console, which further hurts the hardware sales, and so on. The evidence of that can be found in Dreamcast, a console that Sega introduced in 1999, only to discontinue it two years later. Eventually, the failure Dreamcast pushed Sega (once known for its Mega Drive console, which sold 35 million units) out of the console business, emphasizing how high the stakes are in the video game hardware business.
- **Nintendo dummy**. This variable is 1 for titles published by Nintendo (in most cases, that also implies exclusivity for Nintendo's consoles) and 0 for all others. The rationale behind this variable is that Nintendo owns a range of extremely attractive IP with large fan bases worldwide, thus allowing Nintendo to repeatedly publish best-selling games even if they do not feature the most innovate gameplay or graphics. Some anecdotal evidence of that can be found in the fact that Nintendo's first-party games, unlike most of the rest, almost never go on sale (Kaser, 2018). Therefore, my hypothesis for this variable is that Nintendo-published should sell better, all else being equal.

To estimate the impact of the variables described above on the sales of video game software, I used an OLS simple linear regression. The output of the regression, i.e. its coefficients, is described in Table 1. Although the R-Squared is only 0.164, most variables have sufficiently low p-values.

Looking at the coefficients, there are a few curious conclusions we can infer. First, confirming my

initial hypothesis, games with better reviews in the press and among the users tend to sell more units. When it comes to genres, however, the results are not as obvious. For once, action and action-adventure games do not seem to perform much better, with coefficients of just 0.08 and 0.01 respectively, although shooter games performed better (0.23) Furthermore, pure adventure games have a negative correlation with overall sales.

Conversely, the most successful categories were the following: MMO (0.45), party (1.74) and racing (0.28). The MMO (massively multiplayer online) category is, for a large part, driven by sales of World of Warcraft – the only game that managed to persuade players to buy a full-price game and then pay a monthly subscription to continue playing for 10 years – and its expansions. Party games have a more even distribution of sales, with a number of titles selling more than 1 million units despite mixed reviews. Finally, racing games are clearly dominated by Nintendo, with various entries in the Mario Kart series occupying the first four spots in the list of racing best-sellers. Interestingly enough, the next four spots go to Sony and its Gran Turismo series, which indicates that this genre is somewhat of a duopoly in terms of sales concentration. Unlike party games, highest-grossing racing games also tend to have excellent reviews (all titles in top 20 have an average rating of at least 8 out of 10).

In terms of console-specific controls, most of the results are in line with expectations, as more popular consoles contribute positively to software sales and vice versa. There is one output, however, that requires explanation. The dummy variable responsible for Switch games has a negative coefficient of -0.55. That appears to be counterintuitive, given the current sales momentum for Switch hardware. A few explanations can be used to address this result: first, Switch was released less than three years ago and is now hardly in the middle of its lifetime, which in turn means that the software sales are far from its overall potential. Therefore, comparing sales of fresh Switch titles with lifelong sales of games published 5 or more years ago biases the outcome against the Switch games. Second, Switch was released years later than other consoles in the same generation. It could then be the case that cross-platform games, originally developed for PlayStation 4 or Xbox One and then ported to Switch, have largely exhausted their sales potential by the time of their Switch release.

Finally, the regression output confirms my initial hypothesis that games published by Nintendo tend to perform better. With the coefficient of 2.63, this is the single largest factor positively affecting correlation with units sold.

Appendix

Table 1. Regression output

Feature	Coefficient
Average score	0.42
Genre: action	0.08
Genre: action-adventure	0.01
Genre: adventure	-0.57
Genre: fighting	-0.15
Genre: MMO	0.45
Genre: miscellaneous	0.21
Genre: music	-0.46
Genre: party	1.74
Genre: platform	0.11
Genre: puzzle	-0.94
Genre: racing	0.28
Genre: role-playing	-0.24
Genre: sandbox	0.76
Genre: shooter	0.23
Genre: simulation	0.11
Genre: sports	0.13
Genre: strategy	-0.69
Genre: visual novel	-1.05
Platform: Nintendo 3DS	-0.41
Platform: Sega	-0.98
Platform: Nintendo DS	0.29
Platform: Nintendo	-0.45
Platform: Nintendo	-0.33
Platform: Nintendo	-0.55
Platform: Nintendo	-0.45
Platform: PC	0.04
Platform: PlayStation	0.38
Platform: PlayStation 2	0.62
Platform: PlayStation 3	0.47
Platform: PlayStation 4	1.65
Platform: PlayStation	-0.03
Platform: PlayStation	-0.38
Platform: Nintendo Wii	0.77
Platform: Nintendo Wii	-1.20
Platform: Xbox 360	0.36
Platform: Xbox	-0.28
Platform: Xbox One	0.49
Publisher: Nintendo	2.63

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